Coalitions in the United States Supreme Court (1995-2002)

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Abstract

Coalitions provide a way for modeling many types of voting bodies. In a paper entitled "Forming Stable Coalitions: The Process Matters", Steven J. Brams, Michael A. Jones, and D. Marc Kilgour suggest that the U.S. Supreme Court can be modeled by a buildup procedure. In this paper we examine their model and possible problems with it.

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1 Introduction

> *"I must study politics and war, that my sons may have the liberty to study mathematics and philosophy..."* -John Adams.

Voting systems are typically considered to be part of political science. Traditionally various voting schemes are analyzed through the standard empirical and anecdotal methods commonly used by political scientists [BO].

During the 1960s a movement started among political scientists to better quantify voting systems. Some of the earlier proposed models relied heavily on statistical and probabilistic methods [AWW, Ma]. These fell out of favor because they didn't accurately model individual strategies. During the 70s axiomatic models, which tended to use elements of game theory were developed [BO]. These models can accurately describe a situation, but generally require a specific knowledge of each players preferences and strategies.

Recently there has been an effort to model certain voting systems through the formation of coalitions [BJK1]. These systems examine the way in which groups of players join together to form a majority. These models are relatively new and have not been extensively tested to see if they accurately model real world phenomena. It is the purpose of this paper to examine one such model proposed by Brams, Jones, and Kilgour [BJK1].

2 Background

2.1 The Supreme Court

The United States Supreme Court is composed of nine justices nominated by the president and confirmed by the Senate. Currently the nine members, in order of seniority are Chief Justice William Rehnquist, Justice John Paul Stevens, Justice Sandra Day O'Connor, Justice Antonin Scalia, Justice Anthony Kennedy, Justice David Souter, Justice Clarence Thomas, Justice Ruth Bader Ginsburg and Justice Stephen Breyer.

Cases are passed to the Supreme Court by the State and Federal appellate courts. In order for a case to be heard, at least four members of the Supreme Court must agree to hear it. Once a case has been selected oral arguments are presented by each side in front of the nine justices. The justices then confer amongst themselves and circulate sample briefs.

Once the oral arguments are complete the justices confer and take a preliminary vote on the case. The senior member of the majority selects the writer of the opinion. Various versions of the opinion are passed around while justices decide whether to join. There are several recourses of action available to a justice if he decides not to join the opinion of the court. The justice can either file a concurring opinion, a dissenting opinion, an opinion concurring in part and dissenting part, or an opinion concurring in judgment.

While the judgments and reasoning of the court are perhaps the most accessible of any branch of government the decision making process behind these judgments is difficult to access. The court deliberates behind closed doors and does its best to provide a uniform front [Oc]. The process of circulating and adjusting opinions to convince others to join is similar to the ways bills are written and passed within Congress [BJK1]. It therefore makes sense to attempt to gain insite into the decision making process of the Supreme Court through the same means as legislative bodies.

2.2 Mathematics in Social Science

With the development of game theory, mathematics has become useful in modeling and analyzing a variety of social situations. Everything from fairness [BT] to diplomacy and arms races [BK] has been successfully modeled using mathematics. It's only natural to attempt to model voting systems in a similar fashion.

2.3 Voting Schema

Voting has long been an interest of mathematicians. M. Condocert, a French mathematician and social scientist (among other things), discovered the voting paradox over 200 years ago. The voting paradox states that when deciding between three or more outcomes given a set of fairness criteria there is no voting system which can always produce a logical result. This was first properly formalized by K. Arrow, and is commonly known as Arrow's Theorem [Ar]. Since the formalization of this paradox several mathematicians and political scientists have tried relaxing the conditions of Arrow's Theorem with no success. One of the most common applications of mathematics in social science is determining an the most appropriate voting system for a given body [Cr].

Once an appropriate voting schema has been determined it is useful to analyze exactly how voters make their decision. In general all voters are considered to be rational, meaning they follow a certain set of guidelines and attempt to effectively optimize their position, when voting. The simplest system is pure independent voting. Voters simply vote their conscience without regard for how other voters might feel or the impact their vote might have on future elections. If a voting system is truly anonymous it is generally assumed that voting is independent because there is no way for a voter to determine another's strategy.

Many voting systems are not anonymous. This leads to increased complexity with regards to strategy. Not only must voters be concerned about pushing their own objective, but they must now worry about how their behavior will affect other voters and future votes. Voters who hold public office must concern themselves with reelection as support with in their party. A common way to achieve an agenda is through vote trading or log rolling [CV]. To ensure that a particular agenda gets passed a voter will concede, or trade

his vote, on issues for which he does not feel as passionately. This *quid pro quo* allows players to push agendas which they feel strongly about while only having to sacrifice issues for which they care little.

If a player knows how the other players stand on an issue he can rank them based on his own preference. This ranking might include other information such as outside political connections. From this ranking players can choose to form coalitions with other players so that they can guarantee a certain agenda is passed. Many legislatures, especially those with many independent factions, depend on coalition forming. Countries such as Germany, Italy, and Israel all depend heavily on coalitions as part of their legislative process [BJK1].

2.4 Coalitions

In a coalition based voting game of n players each player ranks the other players based on a certain set of criteria. There are two ways in which coalitions can form, fallback (FB) and build-up (BU).

Definition 3 (Fallback [BJK1]) *Players form coalitions by looking progressively lower in their preference rankings until a majority coalition is formed such that all members consider each other to be mutually acceptable at that level.*

Definition 4 (Buildup [BJK1]) *Proceeds the same as the fallback procedure, however majority coalitions only form when their members rank each other highest.*

Example Consider a group of 5 players who rank each other as such:

1	2	3	4	5
2	1	3	4	5
3	4	5	2	1
4	3	2	1	5
5	4	3	2	1

Fallback: Players 1 and 2 rank each other highest, as do players 3 and 4. Thus two level 1 fallback coalitions form, {1,2} and {3,4}. At the next level players 3 and 5 find each other acceptable, leading to {3,5}. Players 1, 2 and 4 find themselves mutually acceptable at level 3, as do players 2, 3, and 4, to give level 3 coalitions of {1,2,4} and {2,3,4}. At this point the process stops as two majority coalitions have been found.

Buildup: The buildup procedure proceeds the same as the fallback for level one. At level 2 {35} does not form because player 3 would rather be in a coalition with 4. Similarly at level 3 neither {124} nor {234} form. Player 2 would rather be in {124} while player 4 would rather be in {234}. A coalition does not form until level 4, where the grand coalition {12345} forms.

It should be noted that any coalition can form during both the buildup and fallback process. The grand coalition is the most likely coalition to form when the buildup procedure is used. This is used later to explain the distribution of decisions for the U.S. Supreme Court. Further explanation and examples are available in a couple of papers by Brams, Jones and Kilgour [BJK1, BJK2].

In their paper *Forming Stable Coalitions: The Process Matters* Brams, Jones, and Kilgour suggested that decisions made by the United States Supreme Court follow a build up procedure. They support their reasoning with a probabilistic argument based on the number of various types of coalitions which form under a buildup process with 9 members.

It is the purpose of this paper to further evaluate this assertion. Because the court is a fluid body it is difficult to compare the decision making process

across separate courts. Fortunately the current court is one of the longest courts in history. Since 1995 the court has had the same nine justices. This has allowed us to consider the decision making process of a particular court, not the average of several different ones.

5 Procedure

5.1 Data Collection

Case data was collected from the Cornell Law School's Legal Information Institute [LII]. Data was collected for all cases from the year 1995 and cases from 1995 to 2002 involving six issues: bankruptcy, First Amendment speech, Fourth Amendment, trademarks, patents, and the Eighth Amendment. A total of 218 cases were processed. The issue data was collected based on a keyword search. There are a couple of problems with this approach. There is a chance that some relevant cases were left out and non-relevant cases put in. The chance of this happening is reduced by only scanning the syllabus, thus references to minor issues in other cases are generally not searched. There is also a good chance of cross over between issues.

5.2 Data Organization

The collected data was organized into a spreadsheet file. Each justices decision was marked with a 1 if they joined or concured with the majority opinion, -1 if they dissented, and 0 if they abstained. When a justice concurred in part and dissented in part the case was broken down into individual parts reflect this. The data as stored does not represent who wrote the opinions, and whether a concurring opinion or multiple dissenting opinions have been filed.

5.3 Calculations

For each of the seven groups of cases (the 1995 case data and the six issues) four sets of values were calculated.

1. **Decision types** The percentages of cases of each coalition type.
2. **Percentage of cases in the majority** This statistic shows for what percentage of the cases in a certain group a justice was in the majority.
3. **Percentage agreements** The percentage of cases in which two justices concur in judgment.
4. **Personal rankings** An estimate of the values of a personal ranking function for each justice based on the percentage of agreements.

The total number of different rankings for n players is [BJK1]:

$$((n-1)!)^n$$

The total number of rankings which have the same player ranked last is:

$$(n-1)((n-2)!)^{n-1}(n-1)!$$

If the distributions of rankings are considered to be random then the probability of achieving such a ranking is:

$$\begin{aligned} P &= \frac{(n-1)((n-2)!)^{n-1}(n-1)!}{((n-1)!)^n} \\ &= n\left(\frac{(n-2)!}{(n-1)!}\right)^{n-1} \\ &= n\left(\frac{1}{n-1}\right)^{n-1} \end{aligned}$$

For $n = 9$, $P = 4.77 \cdot 10^{-7}$

6 Results

6.1 1995 Case Data

The percentages of the various types of decisions for the 1995 cases are shown in Table 1. Table 2 displays the percentage of times each justice is in the majority. Table 3 shows the percentage of times two justices are in agreement. The personal rankings are shown in Table 4. A total of 85 cases were analyzed.

Decision	Percentage
5-4	14.7
6-3	10.5
7-2	15.8
8-1	12.6
9-0	42.1

Table 1: 1995 Case Outcomes

Justice	Percentage
Kennedy	93.7
O'Connor	90.5
Breyer	87.9
Ginsburg	87.4
Rehnquist	86.3
Souter	84.2
Scalia	83.0
Thomas	76.8
Stevens	74.5

Table 2: 1995 Percentage in Majority

Justices		Percentage	Justices		Percentage
Scalia	Thomas	89.4	Ginsburg	O'Connor	77.9
Breyer	Ginsburg	87.9	O'Connor	Scalia	77.7
Breyer	Souter	86.8	Breyer	Rehnquist	75.8
Kennedy	Rehnquist	86.3	Breyer	Stevens	75.8
Rehnquist	Thomas	86.3	O'Connor	Thomas	75.8
Rehnquist	Scalia	86.2	Rehnquist	Souter	74.7
O'Connor	Souter	85.3	Breyer	Scalia	74.4
Ginsburg	Stevens	85.1	Ginsburg	Rehnquist	73.7
Kennedy	Scalia	85.1	Ginsburg	Scalia	72.3
Breyer	O'Connor	84.6	Kennedy	Stevens	72.3
Ginsburg	Souter	84.2	Scalia	Souter	71.3
Kennedy	O'Connor	84.2	Breyer	Thomas	68.1
Ginsburg	Kennedy	83.2	Souter	Thomas	67.4
O'Connor	Rehnquist	83.2	O'Connor	Stevens	67.0
Breyer	Kennedy	81.3	Ginsburg	Thomas	66.3
Kennedy	Thomas	81.1	Rehnquist	Stevens	60.6
Kennedy	Souter	80.0	Scalia	Stevens	59.1
Souter	Stevens	79.8	Stevens	Thomas	53.2

Table 3: 1995 Percentage Agreements

Breyer	**Ginsburg**	**Kennedy**
Ginsburg	Breyer	Rehnquist
Souter	Stevens	Scalia
O'Connor	Souter	O'Connor
Kennedy	Kennedy	Ginsburg
Stevens	O'Connor	Breyer
Rehnquist	Rehnquist	Thomas
Scalia	Scalia	Souter
Thomas	Thomas	Stevens
O'Connor	**Rehnquist**	**Scalia**
Souter	Thomas	Thomas
Breyer	Kennedy	Rehnquist
Kennedy	Scalia	Kennedy
Rehnquist	O'Connor	O'Connor
Ginsburg	Breyer	Breyer
Scalia	Souter	Ginsburg
Thomas	Ginsburg	Souter
Stevens	Stevens	Stevens
Souter	**Stevens**	**Thomas**
Breyer	Ginsburg	Scalia
O'Connor	Souter	Rehnquist
Ginsburg	Breyer	Kennedy
Kennedy	Kennedy	O'Connor
Stevens	O'Connor	Breyer
Rehnquist	Rehnquist	Souter
Scalia	Scalia	Ginsburg
Thomas	Thomas	Stevens

Table 4: 1995 Personal Rankings

6.2 Bankruptcy

The distribution of decisions for cases dealing with bankruptcy is shown in Table 5. Each justices percentage in the majority is shown in Table 6. Tables 7 and 8 show the percentage of cases justices agree with each other and the corresponding personal rankings. A total 15 cases were analyzed.

Decision	Percentage
5-4	0.0
6-3	5.3
7-2	5.3
8-1	36.8
9-0	53.6

Table 5: Bankruptcy Case Outcomes

Justice	Percentage
Scalia	100.0
Kennedy	100.0
Souter	94.7
Rehnquist	94.7
O'Connor	94.7
Ginsburg	94.7
Breyer	94.7
Stevens	89.5
Thomas	73.7

Table 6: Bankruptcy Percentage in Majority

Justices		Precentage	Justices		Precentage
Kennedy	Scalia	100.0	Breyer	Souter	89.5
O'Connor	Rehnquist	100.0	Ginsburg	O'Connor	89.5
O'Connor	Souter	100.0	Ginsburg	Rehnquist	89.5
Rehnquist	Souter	100.0	Ginsburg	Souter	89.5
Breyer	Kennedy	94.7	Kennedy	Stevens	89.5
Breyer	Scalia	94.7	Scalia	Stevens	89.5
Ginsburg	Kennedy	94.7	Breyer	Stevens	84.2
Ginsburg	Scalia	94.7	O'Connor	Stevens	84.2
Ginsburg	Stevens	94.7	Rehnquist	Stevens	84.2
Kennedy	O'Connor	94.7	Souter	Stevens	84.2
Kennedy	Rehnquist	94.7	Kennedy	Thomas	73.7
Kennedy	Souter	94.7	Scalia	Thomas	73.7
O'Connor	Scalia	94.7	Breyer	Thomas	68.4
Rehnquist	Scalia	94.7	Ginsburg	Thomas	68.4
Scalia	Souter	94.7	O'Connor	Thomas	68.4
Breyer	Ginsburg	89.5	Rehnquist	Thomas	68.4
Breyer	O'Connor	89.5	Souter	Thomas	68.4
Breyer	Rehnquist	89.5	Stevens	Thomas	63.2

Table 7: Bankruptcy Percentage Agreements

Breyer	**Ginsberg**	**Kennedy**
Kennedy	Kennedy	Scalia
Scalia	Scalia	O'Connor
Ginsburg	Stevens	Rehnquist
O'Connor	O'Connor	Souter
Rehnquist	Rehnquist	Breyer
Souter	Souter	Ginsburg
Stevens	Breyer	Stevens
Thomas	Thomas	Thomas
O'Connor	**Rehnquist**	**Scalia**
Rehnquist	Souter	Kennedy
Souter	O'Connor	Souter
Scalia	Scalia	Breyer
Kennedy	Kennedy	Ginsburg
Breyer	Breyer	O'Connor
Ginsburg	Ginsburg	Rehnquist
Stevens	Stevens	Stevens
Thomas	Thomas	Thomas
Souter	**Stevens**	**Thomas**
O'Connor	Ginsburg	Kennedy
Rehnquist	Kennedy	Scalia
Kennedy	Scalia	Breyer
Scalia	Breyer	Ginsburg
Breyer	O'Connor	O'Connor
Ginsburg	Rehnquist	Rehnquist
Stevens	Souter	Souter
Thomas	Thomas	Stevens

Table 8: Bankruptcy Personal Rankings

6.3 First Amendment - Speech

The case percentage of case outcomes are represented in Table 9. The percentage of cases in which a justice is in the majority is listed in Table 10. Table 11 shows the percentage of cases in which two justices agree. The personal ranking for each justice is shown in Table 12. A total of 26 cases were analyzed.

Decision	Percentage
5-4	33.3
6-3	18.5
7-2	25.9
8-1	7.4
9-0	14.8

Table 9: First Amendment - Free Speech Case Outcomes

Justice	Percentage
Kennedy	88.9
Breyer	85.2
O'Connor	81.5
Souter	77.8
Stevens	70.4
Rehnquist	63.0
Thomas	63.0
Ginsburg	70.4
Scalia	51.9

Table 10: First Amendment - Free Speech Percentage in Majority

Justices		Percentage	Justices		Percentage
Ginsburg	Stevens	92.6	Ginsburg	Kennedy	59.3
Scalia	Thomas	88.9	Kennedy	Rehnquist	59.3
Breyer	Souter	77.8	Kennedy	Stevens	59.3
Breyer	Stevens	77.8	O'Connor	Stevens	59.3
Souter	Stevens	77.8	O'Connor	Thomas	59.3
Breyer	Kennedy	74.1	O'Connor	Scalia	55.6
Breyer	O'Connor	74.1	Rehnquist	Thomas	55.6
Kennedy	Thomas	74.1	Rehnquist	Souter	48.1
Breyer	Ginsburg	70.4	Breyer	Thomas	48.1
Kennedy	O'Connor	70.4	Ginsburg	Thomas	48.1
Ginsburg	Souter	70.4	Souter	Thomas	48.1
Ginsburg	O'Connor	66.7	Breyer	Scalia	44.4
O'Connor	Rehnquist	66.7	Ginsburg	Rehnquist	40.7
Rehnquist	Scalia	66.7	Rehnquist	Stevens	40.7
Kennedy	Souter	66.7	Stevens	Thomas	40.7
O'Connor	Souter	66.7	Ginsburg	Scalia	37.0
Breyer	Rehnquist	63.0	Scalia	Souter	37.0
Kennedy	Scalia	63.0	Scalia	Stevens	29.6

Table 11: First Amendment - Free Speech Percentage Agreements

Breyer	Ginsburg	Kennedy
Souter	Stevens	Thomas
Stevens	Souter	Breyer
Kennedy	Breyer	O'Connor
O'Connor	O'Connor	Souter
Ginsburg	Kennedy	Scalia
Rehnquist	Thomas	Rehnquist
Thomas	Rehnquist	Stevens
Scalia	Scalia	Ginsburg
O'Connor	**Rehnquist**	**Scalia**
Breyer	Scalia	Thomas
Kennedy	O'Connor	Rehnquist
Rehnquist	Breyer	Kennedy
Souter	Kennedy	O'Connor
Ginsburg	Thomas	Breyer
Stevens	Souter	Souter
Thomas	Stevens	Ginsburg
Scalia	Ginsburg	Stevens
Souter	**Stevens**	**Thomas**
Stevens	Ginsburg	Scalia
Breyer	Breyer	Kennedy
Ginsburg	Souter	O'Connor
Kennedy	Kennedy	Rehnquist
O'Connor	O'Connor	Breyer
Thomas	Thomas	Ginsburg
Rehnquist	Rehnquist	Souter
Scalia	Scalia	Stevens

Table 12: First Amendment - Free Speech Personal Rankings

6.4 Fourth Amendment

The percentage of the various types of decisions for the Fourth Amendment cases are shown in Table 13. Table 14 displays the percentage of times each justice is in the majority. Table 15 shows the percentage of times two justices are in agreement. The personal rankings are shown in Table 16. A total of 31 cases were analyzed

Decision	Percentage
5-4	12.5
6-3	15.6
7-2	18.8
8-1	12.5
9-0	40.6

Table 13: Fourth Amendment Case Outcomes

Justice	Percentage
Kennedy	96.9
Thomas	90.6
Rehnquist	90.6
O'Connor	90.6
Scalia	87.5
Breyer	87.5
Souter	78.1
Ginsburg	71.9
Stevens	59.4

Table 14: Fourth Amendment Percentage in Majority

Justices		Percentage	Justices		Percentage
Scalia	Thomas	96.9	Breyer	Thomas	78.1
Rehnquist	Thomas	93.8	O'Connor	Scalia	78.1
Rehnquist	Scalia	90.6	Ginsburg	O'Connor	75.0
Ginsburg	Stevens	87.5	Kennedy	Souter	75.0
Kennedy	O'Connor	87.5	Souter	Stevens	75.0
Kennedy	Rehnquist	87.5	Ginsburg	Kennedy	68.8
Kennedy	Thomas	87.5	O'Connor	Stevens	68.8
Breyer	Kennedy	84.4	Rehnquist	Souter	68.8
Breyer	O'Connor	84.4	Souter	Thomas	68.8
Kennedy	Scalia	84.4	Breyer	Stevens	65.6
Breyer	Scalia	81.3	Scalia	Souter	65.6
Ginsburg	Souter	81.3	Ginsburg	Rehnquist	62.5
O'Connor	Rehnquist	81.3	Ginsburg	Thomas	62.5
O'Connor	Souter	81.3	Kennedy	Stevens	62.5
O'Connor	Thomas	81.3	Ginsburg	Scalia	59.4
Breyer	Ginsburg	78.1	Rehnquist	Stevens	50.0
Breyer	Rehnquist	78.1	Stevens	Thomas	50.0
Breyer	Souter	78.1	Scalia	Stevens	46.9

Table 15: Fourth Amendment Percentage Agreements

Breyer	**Ginsburg**	**Kennedy**
Kennedy	Stevens	O'Connor
O'Connor	Souter	Rehnquist
Scalia	Breyer	Thomas
Ginsburg	O'Connor	Scalia
Rehnquist	Kennedy	Breyer
Souter	Rehnquist	Souter
Thomas	Thomas	Ginsburg
Stevens	Scalia	Stevens

O'Connor	**Rehnquist**	**Scalia**
Kennedy	Thomas	Thomas
Breyer	Scalia	Rehnquist
Rehnquist	Kennedy	Kennedy
Souter	O'Connor	Breyer
Thomas	Breyer	O'Connor
Scalia	Souter	Souter
Ginsburg	Ginsburg	Ginsburg
Stevens	Stevens	Stevens

Souter	**Stevens**	**Thomas**
Ginsburg	Ginsburg	Scalia
O'Connor	Souter	Rehnquist
Breyer	O'Connor	Kennedy
Stevens	Breyer	O'Connor
Kennedy	Kennedy	Breyer
Thomas	Thomas	Souter
Rehnquist	Rehnquist	Ginsburg
Scalia	Scalia	Stevens

Table 16: Fourth Amendment Personal Rankings

6.5 Trademark

The percentage of the various types of decisions are shown in Table 17. Table 18 displays the percentage of times each justice is in the majority. Table 19 shows the percentage of times two justices are in agreement. The personal rankings are shown in Table 20. A total of 12 cases were analyzed

Decision	Percentage
5-4	9.1
6-3	9.1
7-2	0
8-1	9.1
9-0	63.6

Table 17: Trademark Case Outcomes

Justice	Percentage
Thomas	100.0
Scalia	100.0
Souter	90.9
Rehnquist	90.9
O'Connor	90.9
Kennedy	90.9
Stevens	81.8
Breyer	81.8
Ginsburg	72.7

Table 18: Trademark Percentage in Majority

Justices		Percentage	Justices		Percentage
Breyer	Stevens	100.0	Ginsburg	Souter	81.8
Kennedy	Rehnquist	100.0	Kennedy	O'Connor	81.8
Scalia	Thomas	100.0	Kennedy	Souter	81.8
Breyer	Souter	90.9	O'Connor	Rehnquist	81.8
Kennedy	Scalia	90.9	O'Connor	Souter	81.8
Kennedy	Thomas	90.9	O'Connor	Stevens	81.8
O'Connor	Scalia	90.9	Rehnquist	Souter	81.8
O'Connor	Thomas	90.9	Scalia	Stevens	81.8
Rehnquist	Scalia	90.9	Stevens	Thomas	81.8
Rehnquist	Thomas	90.9	Breyer	Ginsburg	72.7
Scalia	Souter	90.9	Breyer	Kennedy	72.7
Souter	Stevens	90.9	Breyer	Rehnquist	72.7
Souter	Thomas	90.9	Ginsburg	Scalia	72.7
Breyer	O'Connor	81.8	Ginsburg	Stevens	72.7
Breyer	Scalia	81.8	Ginsburg	Thomas	72.7
Breyer	Thomas	81.8	Kennedy	Stevens	72.7
Ginsburg	Kennedy	81.8	Rehnquist	Stevens	72.7
Ginsburg	Rehnquist	81.8	Ginsburg	O'Connor	63.6

Table 19: Trademark Percentage Agreements

Breyer	**Ginsburg**	**Kennedy**
Stevens	Kennedy	Rehnquist
Souter	Rehnquist	Scalia
O'Connor	Souter	Thomas
Scalia	Scalia	O'Connor
Thomas	Stevens	Souter
Ginsburg	Thomas	Ginsburg
Kennedy	Breyer	Stevens
Rehnquist	O'Connor	Breyer
O'Connor	**Rehnquist**	**Scalia**
Scalia	Kennedy	Thomas
Thomas	Scalia	Souter
Rehnquist	Thomas	Kennedy
Souter	Souter	O'Connor
Stevens	Ginsburg	Rehnquist
Breyer	O'Connor	Stevens
Kennedy	Stevens	Breyer
Ginsburg	Breyer	Ginsburg
Souter	**Stevens**	**Thomas**
Stevens	Breyer	Scalia
Thomas	Souter	Kennedy
Breyer	Thomas	O'Connor
Scalia	O'Connor	Rehnquist
Ginsburg	Scalia	Souter
Kennedy	Ginsburg	Breyer
O'Connor	Kennedy	Stevens
Rehnquist	Rehnquist	Ginsburg

Table 20: Trademark Personal Rankings

6.6 Patent

The case percentage of case outcomes are represented in Table 21. The percentage of cases in which a justice is in the majority is listed in Table 22. Table 23 shows the percentage of cases in which two justices agree. The personal ranking for each justice is shown in Table 24. A total of 16 cases were analyzed.

Decision	Percentage
5-4	6.7
6-3	13.3
7-2	13.3
8-1	6.7
9-0	53.3

Table 21: Patent Case Outcomes

Justice	Percentage
Thomas	100.0
Scalia	93.3
Rehnquist	93.3
O'Connor	93.3
Kennedy	93.3
Souter	86.7
Ginsburg	80.0
Breyer	73.3
Stevens	66.7

Table 22: Patent Percentage in Majority

Justices		Percentage	Justices		Percentage
Kennedy	Rehnquist	100.0	O'Connor	Souter	80.0
Ginsburg	Souter	93.3	Rehnquist	Souter	80.0
Kennedy	Thomas	93.3	Scalia	Souter	80.0
O'Connor	Thomas	93.3	Souter	Stevens	80.0
Rehnquist	Thomas	93.3	Breyer	O'Connor	73.3
Scalia	Thomas	93.3	Breyer	Souter	73.3
Ginsburg	Kennedy	86.7	Breyer	Thomas	73.3
Ginsburg	Rehnquist	86.7	Ginsburg	O'Connor	73.3
Kennedy	O'Connor	86.7	Ginsburg	Scalia	73.3
Kennedy	Scalia	86.7	Ginsburg	Stevens	73.3
O'Connor	Rehnquist	86.7	Breyer	Ginsburg	66.7
O'Connor	Scalia	86.7	Breyer	Kennedy	66.7
Rehnquist	Scalia	86.7	Breyer	Rehnquist	66.7
Souter	Thomas	86.7	O'Connor	Stevens	66.7
Breyer	Scalia	80.0	Stevens	Thomas	66.7
Breyer	Stevens	80.0	Kennedy	Stevens	60.0
Ginsburg	Thomas	80.0	Rehnquist	Stevens	60.0
Kennedy	Souter	80.0	Scalia	Stevens	60.0

Table 23: Patent Percentage Agreements

Breyer	**Ginsburg**	**Kennedy**
Scalia	Souter	Rehnquist
Stevens	Kennedy	Thomas
O'Connor	Rehnquist	O'Connor
Souter	Thomas	Scalia
Thomas	O'Connor	Ginsburg
Ginsburg	Scalia	Souter
Kennedy	Stevens	Breyer
Rehnquist	Breyer	Stevens
O'Connor	**Rehnquist**	**Scalia**
Thomas	Kennedy	Thomas
Rehnquist	Thomas	Kennedy
Scalia	Scalia	O'Connor
Kennedy	Ginsburg	Rehnquist
Souter	O'Connor	Souter
Breyer	Souter	Breyer
Ginsburg	Breyer	Ginsburg
Stevens	Stevens	Stevens
Souter	**Stevens**	**Thomas**
Ginsburg	Breyer	Kennedy
Thomas	Souter	O'Connor
Stevens	Ginsburg	Rehnquist
Kennedy	Thomas	Scalia
O'Connor	O'Connor	Souter
Rehnquist	Kennedy	Ginsburg
Scalia	Rehnquist	Breyer
Breyer	Scalia	Stevens

Table 24: Patent Personal Rankings

6.7 Eighth Amendment

The distribution of decisions for cases dealing with the Eighth Amendment is shown in Table 25. Each justices percentage in the majority is shown in Table 26. Tables 6.7 and 28 show the percentage of cases justices agree with each other and the corresponding personal rankings. A total of 19 cases were analyzed.

Decision	**Percentage**
5-4	36.8
6-3	21.1
7-2	10.5
8-1	15.8
9-0	15.8

Table 25: Eighth Amendment Case Outcomes

Justice	**Percentage**
Kennedy	89.5
O'Connor	84.2
Thomas	78.9
Scalia	73.7
Rehnquist	73.7
Souter	68.4
Ginsburg	68.4
Breyer	63.2
Stevens	52.6

Table 26: Eighth Amendment Percentage in Majority

Justices		Percentage	Justices		Percentage
Breyer	Souter	94.7	Ginsburg	Kennedy	57.9
Scalia	Thomas	94.7	Ginsburg	O'Connor	52.6
Breyer	Stevens	89.5	Kennedy	Stevens	52.6
Ginsburg	Souter	89.5	O'Connor	Souter	52.6
Rehnquist	Scalia	89.5	Breyer	O'Connor	47.4
Breyer	Ginsburg	84.2	Ginsburg	Thomas	47.4
Kennedy	O'Connor	84.2	Souter	Thomas	47.4
Rehnquist	Thomas	84.2	Breyer	Thomas	42.1
Souter	Stevens	84.2	Ginsburg	Rehnquist	42.1
O'Connor	Rehnquist	78.9	Ginsburg	Scalia	42.1
O'Connor	Scalia	78.9	Rehnquist	Souter	42.1
Ginsburg	Stevens	73.7	Scalia	Souter	42.1
Kennedy	Rehnquist	73.7	Breyer	Rehnquist	36.8
Kennedy	Scalia	73.7	Breyer	Scalia	36.8
O'Connor	Thomas	73.7	O'Connor	Stevens	36.8
Kennedy	Souter	68.4	Stevens	Thomas	31.6
Kennedy	Thomas	68.4	Rehnquist	Stevens	26.3
Breyer	Kennedy	63.2	Scalia	Stevens	26.3

Table 27: Eighth Amendment Percentage Agreements

Breyer	Ginsburg	Kennedy
Souter	Souter	O'Connor
Stevens	Breyer	Rehnquist
Ginsburg	Stevens	Scalia
Kennedy	Kennedy	Souter
O'Connor	O'Connor	Thomas
Thomas	Thomas	Breyer
Rehnquist	Rehnquist	Ginsburg
Scalia	Scalia	Stevens

O'Connor	Rehnquist	Scalia
Kennedy	Scalia	Thomas
Rehnquist	Thomas	Rehnquist
Scalia	O'Connor	O'Connor
Thomas	Kennedy	Kennedy
Souter	Souter	Souter
Ginsburg	Ginsburg	Ginsburg
Breyer	Breyer	Breyer
Stevens	Stevens	Stevens

Souter	Stevens	Thomas
Breyer	Breyer	Scalia
Ginsburg	Souter	Rehnquist
Stevens	Ginsburg	O'Connor
Kennedy	Kennedy	Kennedy
O'Connor	O'Connor	Ginsburg
Thomas	Thomas	Souter
Rehnquist	Rehnquist	Breyer
Scalia	Scalia	Stevens

Table 28: Eighth Amendment Personal Rankings

7 Analysis

7.1 1995 Cases

As predicted by the buildup procedure Table 1 there are significantly more 9-0 decisions than any other type. The number of 5-4 decisions is only about 1 percent less than the number of 7-2 decisions, and the number of 6-3 and 8-1 decisions are lower than that. This is almost as predicted by the buildup procedure and might be explainable by a lower number of samples. It should be noted that the presence of 8-1 coalitions is significantly higher than predicted in the calculations.

Brahms et. al assume that the the ranking of each justice is random from case to case. If this were true it would be expected that justices would agree and disagree with each other about equally. From Table 3 it is clear that certain justices agree with each other considerably more often than others. Scalia and Thomas agree with each other almost 90 percent of the time where as Stevens and Thomas agree with each other only 53.2 percent of the time. That number is even lower when we consider that 42.1 percent of the cases were a unanimous decision.

Further more, as seen in Table 4 Stevens and Thomas are the only two justices which appear at the bottom of every single ranking function for the 1995 case data. This suggest that these justices are on ideologically different ends of the court (they are in fact at the bottom of each others ranking functions respectively). If this is the case then the assumption of a random distribution of ranking functions is unfounded.

Kennedy on the other hand is never ranked in the bottom half of any justices ranking functions as well as never being the first choice. This indicates that Kennedy is probably a more moderate member of the court. Further evidence for this comes from the fact that Kennedy sided with the majority in 93.7 percent of the cases of 1995 (Table 2).

It seems likely that while the court may follow a buildup procedure, the distribution of rankings across cases is certainly not random. In order to get a better idea of how coalitions might form it is useful to take a closer issues. By looking at issues that are traditionally considered contravertial and others that involved more technical points of the law insight into how certain members of the court vote.

7.2 Issues

A total of six issues were examined during the course of this project. The legal issues surrounding bankruptcy, trademark disputes, and patent law were assumed to largely involve technical clarification of the law while those concerning the freedom of speech in the First Amendment, the Fourth Amendment, and the Eighth Amendment were assume to involve more philosophical interpretation of the law.

Tables 5, 9, 13, 17, 21, and 25 show a clear difference in the distributions of the types of decisions across the cases dealing with various issues. The three issues assumed to involve largely technical legal issues show a higher than average (based on 1995 case data) number of 9-0 decisions. In particular for cases bankruptcy involving bankruptcy 53.6 percent of the cases were unanimous, while 36.8 percent were 8-1 decisions and none were 5-4 decisions. Likewise cases involving trademark law had 63.6 percent of the decisions be unanimous. This is a marked departure from what would be expected of a randomized ranking distribution.

On the other hand both the cases involving the First Amendment and those involving the Eighth Amendment had roughly the same percentage of 5-4 and 6-3 decisions, roughly 35 percent and 20 percent respectively.

The cases involving the Fourth Amendment and Patent law were more in line with the distributions suggested by the 1995 case data. This suggests that these issues might have a closer to random distribution of ranking functions.

It should be noted that in each individual issue Stevens is at the bottom of Thomas's ranking function. Even in radically different case issues Stevens and Thomas still remain on opposite ends of the court. This is further evidence for the lack of a random distribution of ranking functions.

7.2.1 Bankruptcy

In Table 6 it can be seen that in cases involving bankruptcy Scalia and Kennedy have always been in the majority. This trivially implies that Scalia and Kennedy always agree, as seen in Table 7. Furthermore Table 7 shows that O'Connor, Rehnquist, and Souter always agree with each other, however not always in the majority. This suggests that Scalia and Kennedy are in the middle, providing the connection between the 3 coalition mentioned above and the remaining members of the Court.

In the one case that O'Connor, Rehnquist, and Souter did not agree (the 6-3 case), it appears that Kennedy and Scalia formed a coalition with Ginsburg, Breyer, Stevens and Thomas. Given the rankings presented in Tables 8 this formation is actually predicted by the buildup process. Breyer, Ginsburg, Stevens, and Thomas all rank Kennedy and Scalia in the top two positions. Thus if Scalia and Kennedy were to every disagree with the 3 coalition mentioned above this six coalition would most likely form.

Table 8 shows that both Stevens and Thomas are at the bottom of everybody's ranking function. Despite 54.6 percent of the cases being unanimous, Stevens and Thomas only agree 63.2 percent of the time. Thomas also is in the minority the most often, only being in the majority in 73.7 percent of the cases. This is compared to all the other justices 95-100 percent inclusion in the majority.

7.2.2 First Amendment - Speech

As suspected the First Amendment is a controversial issue. Table 9 shows that 33.3 percent of the decisions resulted in 5-4 splits. The next two highest were 7-2 and 6-3, leaving the generally most common unanimous decision occurring only 14.8 percent of the time.

From Table 11 we can see that Ginsburg and Stevens form a coalition at one end of the court and that Scalia and Thomas form one at the other. Both coalitions form roughly 90 percent of the time. Ginsburg and Stevens then probably form a 4 coalition by bringing in Breyer, Souter. When a 5 coalition forms it most likely includes Kennedy, who is in the majority 88.9 percent of the time. There is also a chance that O'Connor would be the fifth member of a coalition containing Ginsburg, Stevens, Breyer, and Souter. This is evidenced by the general low ranking of Scalia by all five justices. In this case it's Scalia and Stevens who are most opposed, agreeing with each other only 29.6 percent of the time. It is remarkable that Stevens appears both at the top and bottom of Table 11. This is an indication of a polarized Court.

7.2.3 Fourth Amendment

Within issues pertaining to the Fourth Amendment a coalition containing Scalia, Thomas, and Rehnquist forms 90 percent of the time (Table 15).

Table 14 suggests that this coalition seems to be often extended to include Kennedy and O'Connor. Kennedy, Thomas, Rehnquist, and O'Connor are in the majority coalition over 90 percent of the time.

The distribution seen throughout the Fourth Amendment is probably a good example of where the build up process is applicable. There is a definite division in the court. Stevens and Scalia only agree 46.9 percent of the time, and 40.6 percent of those decisions are unanimous. Yet there are still more unanimous decisions than any other type by far as predicted by the buildup process. At the same time Table 16 shows the formation of certain coalitions before the grand coalition allowing for the higher numbers of 7-2 decisions.

Stevens and Scalia again find themselves as the only two justices at the bottom of some-bodies ranking. In this case however Stevens is only in the majority 59.4 percent of the time while Scalia is in the majority 87.5 percent of the time.

7.2.4 Trademarks

The cases involving trademarks provide an interesting example. There are three 2-coalitions which form at the first level according to Table 20. Breyer-Stevens, Kennedy-Rehnquist, and Scalia-Thomas all agree with each other 100 percent of the time. These three 2-coalitions are then joined by Souter, and O'Connor in the next level.

In this issue Ginsburg is at the far end of the court. Ginsburg is never in a non-unanimous majority with O'Connor, and only in one otherwise. Stevens however still remains at the bottom just above Ginsburg.

7.2.5 Patents

Thomas who does not generally rank high in the overall case data is surprisingly in every majority coalition with regards to Patents (Table 22). Table 21 shows that distribution is typical for a buildup type process. Kennedy and Rehnquist always formed a 2-collation in these cases (Table 23).

Because Thomas is always in the majority it is possible to be definite about the formation of certain coalitions. The 5-coalition containing Kennedy, O'Connor, Rehnquist, Scalia, and Thomas formed 93.3 percent of the time. This accounts for all the cases except the 5-4 decision. In the 5-4 decision

it was Stevens, Thomas, Ginsburg, Souter, and Breyer against Kennedy, O'Connor, Rehnquist and Scalia.

Again Stevens appears at the bottom six Justices rankings. These are the same judges who generally form the 5-coalitions. Scalia and Breyer are also on the bottom of just about everyone else rankings. This suggests the two different 5 coalitions that Thomas had to choose from.

7.2.6 Eighth Amendment

The Eighth Amendment is another apparently contravertial issue within the court. Table 25 shows that 36.8 percent of the decisions were 5-4 votes. As in the First Amendment Scalia and Thomas agree with each other 94.7 percent of the time (Table 6.7). The other popular 2-coalition in this issue is Breyer and Souter. As usual Kennedy and O'Connor are at the top of Table 25 indicating that they are more moderate members of the court.

7.3 Implications

The basic premise behind the buildup process is that any coalitions which form are stable. That is to say no member of the majority coalition would rather be in another coalition. This is a pretty stringent requirement.

Because of the difficulties in forming a buildup coalition oftentimes the only situation in which a majority of members can agree that there is no better decision is the grand coalition, or 9-0 vote. While in some voting bodies the only means for expressing an opinion are through the means of a vote this is not the case in the Supreme Court.

If a justice feels that their opinion is not being accurately represented by the majority coalition they have several options. If they fundamentally agree with the decision, but are dissatisfied with the writing of the opinion they can file a concurring opinion. It is also not necessary for a justice to agree entirely with a decision, they can file a brief which agrees in part and dissents in part. Finally if a justice does not agree with the decision they can file a dissenting opinion. There is no limit to the number of a dissenting opinions which can be filed so a justice need not fear of being associated with views he does not agree with by siding with the minority.

Coalitions formed using the buildup procedure generally avoid the phenomena of 'my friend's friend is a friend' and 'my enemy's enemy is my friend'

which can lead to strange bed-fellows in majority coalitions. In the Supreme Court this problem is solved through the use of opinions. Two ideologically opposed justices can vote the same way on an issue and circulate two different opinions.

In support for their suggestion that the U.S. Supreme Court can be modeled using a buildup coalition process Brams, et al. cite two specific examples. The first is the unanimous decision, *United States v. Nixon* (1974), the case involving the White House tapes. They describe two 3-member coalitions, one consisting of Brennan, Douglas and Marshall, the other of Blackmun, Powell, and White. This left Stewart in the middle and Burger ranked last by all justices. If the buildup procedure accurately modeled the decision making process then a 7-1 decision would have resulted. Brams, et al. attribute the 8-0 decision to Burger giving into pressure, and maintain that this is an example of the buildup process.

This is a problematic way to reconcile the differences between what the buildup model would predict and what actually happened. There was concern within the court that due to the supreme political importance and public interest in the case an unanimous decision would be necessary. This put pressure on Burger to join the majority which may or may not exist in general cases. Paradoxally the same importance of the case which made insider accounts available makes it an unsuitable candidate to support the buildup theory.

Brams, et al. then present a 1972 case dealing with obscenity. They describe the situation as follows:

> With the Court deadlocked 4-4, it turned to Blackmun to cast the fith and decisive vote: Between the two protagonists, "he [Blackmun] could make his new friend Brennan or his old friend the Chief [Burger] author of the majority opinion"

In the end Blackmun sided with Burger, but only after Burger made a concession. This leads to the conclusion that "the rankings presumed in the FB and BU models may not be set in stone".

If the rankings presumed in the fallback and buildup models are not set in stone this brings into the question of what good these models are. Even the classifications of liberal and conservative don't provide much insight into the rankings of the justices. Blackmun, classified a liberal and Burger, a conservative, had the highest level of agreement between any two justices between 1970 and 1974 at 83 percent [BJK1].

With neither an assumption of static rankings, or any real way to determine rankings prior to a decision the buildup procedure is of little use beyond understanding how coalitions form at a specific instance. This makes it almost vacuous. The amount of insight into the actual workings of the Supreme Court is limited. As noted above, only those cases which are especially important either politically or socially ever have the decision process itself be examined thoroughly. This makes the already difficult to use buildup procedure even more difficult to verify.

7.4 Further Explanations

Additional difficulties in modeling Supreme Court decisions is presented by Sandra Day O'Connor in her recent book, "The Majesty of the Law: Reflections of a Supreme Court Justice" [Oc]. Through out the course of the book O'Connor describes the courts of several important Chief Justices.

William Howard Taft, Chief Justice of the United States from 1921 to 1930, is noted for his remarkable reformation of the Cour. Taft placed great value on the unanimous decision. During the Court led by Taft 84 percent of the opinions were unanimous. The first Chief Justice, John Marshall, achieved an even more impressive record. During the first four years on the bench he had only one separate concurring opinion and no dissents.

Marshall attributed the success of his courts ability to achieve unanimity to his method of circulating opinions. Each opinion was revised continually until every member of the court agree. This is process is similar to one that the buildup procedure would predict. However it is also known that Justices were encouraged to acquiesce in opinions in which they did not agree [Oc].

Taft is said to have gone further than Marshall in his attempts at maintaining a unanimous court. It is suggested that he suppressed as many as two hundred dissenting votes. It has also been found that 30 percent of the unanimous votes required a Justice to change his vote. Such tactics are not modeled by the build up procedure which only uses personal preference to decide the formation of coalitions.

It is clear that while certain politicking in the court can be modeled using the buildup procedure, other elements cannot. One of the tenants of the buildup procedure is that a unanimous decision is always possible, and in fact generally the most likely outcome. However, in light of instances sited above there are other explanations for the high number of unanimous

decisions.

8 Conclusions and Recommendations

Both personal accounts and statistical analysis suggest the forming of coalitions within the Supreme Court during the process of deciding a case. The very nature of the Supreme Court invites it. However this process is probably not best modeled by the buildup process proposed by Brams, et al. [BJK1].

The assumption that the occurrence of various ranking functions is more or less random in the supreme court is most definitely false. Certain justices, such as Stevens, almost always are at odds with the rest of the court when a non-unanimous decision is made. A justice such as Stevens is almost certainly going to be ranked at the bottom of many peoples ranking functions no matter what the issue.

If a buildup process were to be used to model the Supreme Court a correct distribution of rankings would have to be found. Such a model would have to account for such non-rank related phenomena such as the desire for a unanimous vote, sometimes at the sacrifice of ones own personal agenda.

The issue of who writes the opinions is also important. It would be interesting to see what coalitions form when a certain justice write the opinion. Cases which draw a larger than usual number of dissenting/concurring opinions are also worth looking at.

Fallback and buildup coalition forming may be appropriate for modeling certain voting bodies. There is certainly evidence that many of the parliamentary governments and the U.S. Congress works using a coalition based system [BJK1]. However FB and BU coalitions might not necessarily appropriate for small less politically motivated bodies. Even if a few members of the court operate under the assumptions of coalition building, others may not in which case it falls apart.

To further study this issue a more indepth study of supreme court case data could be looked at. If data for every court was broken down issue by issue it might be possible to reconstruct the rankings for each justice, or show that such a ranking has an inherent contradiction. Looking at issue data from other long running courts my also help shed light on this problem.

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